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ABSTRACT

To determine how much prior knowledge affects students' performance on a reading comprehension test, a study was undertaken to examine the prior knowledge factor in a reading competency test developed for college freshmen in New Jersey. The passages used in this test are based on common, everyday topics. Subjects were students in two sections of a basic skills class, both taught by the same instructor and using the same materials as the core program. In addition, subjects serving as the experimental group read supplementary articles related to topics on the test, while subjects in the control group read articles on nonrelated topics. Data were taken from scores achieved on the state-mandated competency test before the students were admitted to college and again during the last week of the basic skills course. To determine if the students were aware of their knowledge about the topics on the test, they were also administered a prior knowledge inventory. Data analysis showed that (1) exposure to the topics did not significantly increase the experimental group's test scores, (2) instruction in basic comprehension skills did significantly increase the scores of both groups, and (3) awareness of topic knowledge did not make a significant difference in scores. (Copies of the prior knowledge inventory, the course syllabus, and titles of the supplementary reading materials are appended.) (FL)

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TESTING A TEST: THE EFFECT OF PRIOR KNOWLEDGE ON A STANDARDIZED TEST

A Graduate Project Presented to the
Faculty of William Paterson College

In Partial Fulfillment of the
Requirements for the Degree
of Master of Reading

Presented to:

Dr. Joan T. Feeley
Research In Reading
December, 1985

Submitted by:

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Abstract

A follow-up to a study that showed prior knowledge bias in the curriculum-specific Nelson-Denny Reading Test (Feeley, Wepner, and Willging, 1985), this study proposed to examine the prior knowledge factor in a state-developed reading competency test for college freshmen, the New Jersey College Basic Skills Placement Test (NJBSPT). The paragraphs used in this test are based on common, everyday topics. One section of a freshmen basic skills class served as the experimental group and read supplementary articles related to the topics of the NJBSPT while another section, which read placebo selections, served as the control. Both sections were taught by the same instructor, using the same text and novels as the core program. An analysis of variance, repeated measures, (Sex X Treatment X Trials) on the criterion measures (NJCBSPT) showed that the treatment (exposure to the test topics) did not account for significant differences between the groups. The performance of both groups on the test did significantly improve from pre- to post-test, showing that the direct teaching of reading strategies and much reading practice can help to improve reading ability. It was concluded that a test like the NJCBSPT, with its general-interest selections, is not as biased by the prior knowledge factor as is a test like the Nelson-Denny which is composed of selections drawn from the typical comprehensive high school curriculum.

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CHAPTER I

The Problem

In order to analyze the results of a reading comprehension test, one must understand what is being tested. Reading comprehension has been understood, defined, and described in many terms over the years. Today, psycholinguists are describing reading and reading comprehension in new terms. One common basic element of these definitions of reading is that reading comprehension depends on what the reader brings to a passage. What the reader brings to the print in order to get meaning from it is his prior knowledge (Goodman, 1973; Smith, 1982; Pearson and Johnson, 1978). That the prior knowledge of a student is important in relation to reading has been recognized by teachers for many years (Stevens, 1982; Johnson and Barrett, 1981). However, only in the past few years has the question of how much effect prior knowledge has on reading been researched.

Because prior knowledge appears to play an important part in reading comprehension, a serious question may be raised: What is really being tested on most reading comprehension tests? Are the students being tested on their reading comprehension ability or on prior knowledge?

Purpose of the Study

This study is an extension of a study done by Feeley, Wepner and Willging (1985) on the effects of prior knowledge on the Nelson Denny Reading Test (N-D). They studied the effect of prior knowledge on the performance of college freshmen on a widely used standard

test, N-D. The reading comprehension section of the N-D includes eight selections of materials from high school and college level readings which represent the humanities, social sciences, natural and physical sciences. Students in the experimental group were exposed to the topics through supplemental articles and discussion while the students in the control group read and discussed articles on subjects other than the test topics. The results of this study indicated that college freshmen who were exposed to the topics did significantly better on the post-test of the N-D than those who were not exposed.

The conclusion drawn from the data raised the question: Are all comprehension tests significantly biased by prior knowledge or only those containing text selected from specific academic areas?

The major purpose of this study is to determine the effects of direct exposure to the topics on post-test scores of the New Jersey College Basic Skills Placement Test (NJCBSPT). The NJCBSPT is a test which assesses a student's ability to answer questions about passages on common, everyday topics.

A second purpose of the study would be to investigate whether or not the students who were exposed to the topics would indicate awareness of this knowledge on a teacher-made inventory.

Statement of the Problem

Is the NJCBSPT, which tests comprehension using passages on everyday topics, biased by prior knowledge?

Hypothesis

There will be no significant difference between college freshmen who receive exposure to the topics on the NJCBSPT and those who do not.

Definitions

In this study these terms will be defined as follows:

1. Comprehension - "a set of generalized knowledge-acquisition skills which permit people to acquire and exhibit information gained as a consequence of reading printed language" Bormuth (1969, p.50).

2. Content or factual knowledge - the information one has about a specific subject and about the world in general.

3. Metacognitive knowledge - the information one has concerning the state of one's own knowledge base and the demands the task will require.

4. Prior knowledge - what the reader brings to the print in order to get meaning. Other terms for prior knowledge are knowledge of the world, schemata, and prior learning.

5. Strategic knowledge - the information one has about the rules, procedures, tricks and routines that one learns to use in order that learning can take place efficiently.

Limitations

Since the quasi-experimental design of this teacher-initiated action research is a nonequivalent-control group design, it has fairly high validity. However, the study does have some limitations. The sample was atypical, as well as small in size. Because the

students were selected on the basis of their poor scores on the pretest of the NJCBSPT, the testing threat of regression toward the mean must be considered in analyzing the results. Since prior knowledge was not measured before the study, this remains an important uncontrolled variable. The small sample further restricts the generalization of the results.

Significance of the Study

Although a large body of research has been done on prior knowledge and its effect on comprehension, the effect of prior learning in respect to specific tests has received little attention. Johnston's (1984) study of 240 eighth graders showed that prior knowledge affected their scores on a comprehension test given to them. The study of the N-D showed that a curriculum-specific test was affected by exposure to topic information. It will be important to see if the same will hold true for a test that supposedly is based on general topics.

It is important to understand whether or not prior knowledge is a significant variable. College students in New Jersey are placed in basic skill reading courses on the basis of their poor performance on the NJCBSPT because it has been assumed that below-average scores indicated poor comprehension abilities. This study might indicate whether or not this may be true.

The conclusions of this research could encourage further research into the effect of prior learning on other standardized reading comprehension tests. The information gained would be helpful

to faculty members making decisions about the placement and remediation of students, not only on the college level, but at all levels of education.

CHAPTER II

Review of the Literature

In this chapter, research concerning the effect of prior knowledge on comprehension will be discussed first. Next, some theories about the effect of prior knowledge on test responses will be presented. Finally, some concluding remarks about the literature in this area will be made.

Prior Knowledge

What the reader brings to the print in order to get meaning is his prior knowledge. Prior knowledge is known by many terms such as knowledge of the world, schemata, and prior learning. This information which the reader brings to the text is important in the reading process because one cannot learn anything unless it can be connected to something which is already known, according to psycholinguists such as Johnson and Barrett (1981), Smith (1982) and Weaver (1980).

This vast store of knowledge is organized into networks of categories which can overlap. In terms used by computer scientists, these categories could be called schemata or scripts. New information must become linked to the existing schemata in order to be stored in long-term memory. Sometimes the new information cannot be added without revision of the existing schemata. In some cases what is learned causes the creation of a new schema. Or as Smith writes, "...the principle is always the same; stay with your theory for as

long as it works, modify your theory; look for another hypothesis whenever it fails" (Smith, 1982, p.23). Johnson sums this up, "...comprehension is the process(es) involved in forming, elaborating, modifying, or integrating these knowledge structures" (Johnston, 1983, p.17).

Categories of Prior Knowledge

Prior knowledge can be classified into three categories (Johnston, 1983). The first type is strategic knowledge. This is the store of information containing the rules, procedures, tricks and routines that one learns to use in order that learning can take place efficiently. The second type is content or factual knowledge which is the information one has about a specific subject and about the world in general. Metacognitive knowledge, the final type, includes the information one has concerning the state of one's own knowledge base and the demands the task will require.

Strategic Knowledge

First, the area of strategic knowledge shall be considered. Regardless of which skills one decides are necessary for comprehension, it is the reader's prior learning of the skill and the text itself that brings meaning to print. A crucial role is played by prior learning in such skills as drawing inferences, determining main ideas, discovering a meaningful structure and making an application (Stein and Baker, 1981). There is a need for more research to be done in this area of strategic knowledge. However, some recent research has been done with interesting results.

One area currently receiving the most attention is the effect of prior knowledge of logical structure on comprehension. Most of this research has been done on narrative writing (Stein and Baker, 1981). Readers have a general knowledge of what a story is, with more specific ideas about the structure of the story. In other words, they have an organizing framework or story grammar which is used to integrate incoming information.

Stein and Baker (1981) refer to several studies which assessed children's knowledge of story grammars. One of the studies mentioned was conducted by Stein and Glenn and included kindergarteners, third and fifth graders. The children were told a story for which they had to supply an ending. The conclusion of the research, based on the quality of the story ending, was that as children develop and grow older, their knowledge of a well formed story structure increases. Others, such as Leonda, Sutton-Smith and Botvin and Mahoney, have done similar studies with the same results.

Even young children seem to have a sense of story grammar. In their article, Stein and Baker (1981) point out that the most important observation that all the researchers made was that children as young as four and five are capable of creating their own well structured stories after being exposed to stories. Johnston (1983) notes that a study by Brown and Murphy found that children who were four years old could recall the pictures which had been placed in a logical order better than a random arrangement of pictures. This research seems to indicate that children do have a framework of how

a story is constructed which is less developed but present in young children.

The knowledge of story grammar appears to affect comprehension. Fitzgerald and Spiegel (1983) did a study to see if instruction in narrative structure would improve comprehension. Twenty average and below-average fourth grade readers who lacked a keen sense of narrative structure were chosen. They were randomly assigned to two groups. The experimental group was given special instruction to develop the children's knowledge of story structure. The control group was given instruction in dictionary usage and word study.. The instruction was given in two phases. The first was short-term intensive instruction. Long term intermittent instruction was given in the second phase. The conclusion was that the instruction in narrative structure did, indeed, increase the comprehension of the experimental group. The effects were observed after phase one and remained the same through phase two.

The many different organizational patterns of expository text have made it more difficult to research. Therefore, less study has been done in this area. According to Stein and Baker (1981), some studies in this area have been done. Johnston (1983) states that work by Clements, Grimes and Meyer has shown that structures do exist in expository text and that they are, in fact, used by people in bringing meaning to print. Johnston concludes that the understanding of structure increases text comprehension by allowing readers to rapidly build a model or schema from the text which would explain the relationships within the text.

Another area of strategic knowledge which has received attention from the researchers in the past few years is inferential thinking. Making an inference could be defined as the ability or skill to consider new information in light of what one already knows (Stein and Baker, 1981). Therefore, making inferences is an important part of comprehension. Comprehending the simplest prose selection requires a great amount of inference making (Johnson and Barrett, 1981).

Inferring appears to be involved in all reading tasks or skills (Johnson and Barrett, 1981). According to Johnston, "...reading comprehension is viewed as the process of using the cues provided by the author and one's prior knowledge to infer the author's intended meaning. This involves a considerable amount of inferencing at all levels as one builds a model of the meaning of the text" (Johnston, 1983, p.9).

Trabasso (1980) theorizes that the following prior knowledge is needed to make inferences:

1. Background (global) knowledge
2. Knowledge of text structure
3. Knowledge about social interaction
4. Knowledge of casual relations between events

The two types of text-based inferences are text connecting and slot filling (Johnston, 1983; Trabasso, 1980; Stein and Baker, 1981). The first are inferences which interrelate the ideas of the text through semantics or logic. Slot-filling inferences are ones which fill in the gaps of the text model with information from prior

knowledge (Trabasso, 1980; Stein and Baker, 1981).

Although research in this area has been done and many theories of reading assume that inferencing plays an important role in reading comprehension, the experimental tasks are not related to reality and the results leave many questions unanswered (Stein and Baker, 1981).

Stein and Baker (1981) refer to the work of Brown, Smiley, Day, Townsend and Lawton as a study which demonstrates that children do make inferences. In this research project, children in second, fourth and sixth grades were presented with passages that could be interpreted by referring to a framework which had been provided prior to the reading. The answers to probe questions indicated that the children did use information from the orienting framework to help their comprehension of the story. Stein and Baker (1981) claim that other researchers such as Stein and Glenn and Omanson, Warren and Trabasso have also shown through their studies that young children draw inferences from stories.

The use of prior knowledge to draw inferences can be observed in the following study by Anderson, Reynolds, Schallert and Goetz (1977). Thirty female college music majors and thirty male college physical education majors were used in this study. The subjects were given two passages which have two interpretations. The one could be interpreted as a prison break or given a wrestling interpretation. The other one could be interpreted as an evening of card playing or a musical rehersal. The conclusion of the

researchers after analyzing the data was that "...evidence obtained in the present study indicates that people's personal history, knowledge and beliefs influence the interpretations they will give to prose passages" (P. 381).

Stein and Baker (1981) state that although the research concerning inferences has been weak, there is enough evidence to suggest that children can and do make inferences which supplement explicit material when reading by assessing their prior knowledge. Inferences help the child resolve lexical ambiguity, resolve nominal and pronominal references, establish context and establish a larger framework "model" (Trabasso, 1980).

Research in the area of strategic knowledge has been done on story grammar, expository structure and inference making. The results of these studies appear to support the theory that prior knowledge of strategies does increase one's comprehension of a topic.

Content or Factual Knowledge

The second type of knowledge, content or factual, is usually referred to as global knowledge. Smith (1982) refers to this information as "the theory of the world". This information can be specific information about certain subjects.

A study showing the difference between general knowledge and specific content knowledge was conducted in a community college in Richmond, Virginia (Hirsch, 1984). It was discovered that the students of this college had little knowledge about Ulysses S. Grant

or Robert E. Lee. On passages about these two generals, the students performed as poorly on the questions following the passages as they did on the questions covering a passage about Hegel's metaphysics. Yet on a passage about friendship their performance was equal to highly educated readers.

The study done by Feeley, et al. (1985) indicated that prior knowledge of the specific content of the academically based passages of the N-D improved test scores on this reading comprehension test.

A study done by Marr and Gormley (1982) investigated the effect of different qualities of prior knowledge on fourth graders. The prior knowledge these students already had of different sports was assessed. The students were then given a story of a sport with which they were familiar and a story about a sport with which they were unfamiliar. The conclusion the researchers came to after examining the results was that the influences of prior knowledge appear to be layered. General world knowledge, which does have an effect on comprehension of both topics and subtopics, is the top layer. Knowledge about a similar subtopic is the next layer. This knowledge influences a child's comprehension of a specific subtopic. Finally, the third layer is knowledge about that passage's particular subtopic. Knowing about the specific subject helped the child comprehend the passage. Specific knowledge was the most helpful. However, knowing about a similar sport helped the child comprehend an unfamiliar one better. The child had the most difficulty comprehending a passage about a sport which was both

unknown and unlike any known sport.

Stevens (1982) did a study of ninth graders in which each student's high and low subject areas were identified. They were then given paragraphs corresponding to each of these subjects. The results showed that comprehension was significantly aided by high prior knowledge.

Both Levin and Pressley (1981) and Stevens (1982) discuss a study done by Pearson, Hansen and Gordon. In this study of second graders it was discovered that those children who were determined by testing to have prior knowledge of spiders did better on questions where prior knowledge could be applied than those who had little or no prior knowledge of spiders. In contrast, both groups performed similarly on questions that were based on information explicitly stated in the text and that were not dependent on prior knowledge.

Another study showing the importance of background knowledge was done by Professor Richard Anderson and his associates (Hirsch, 1984). Passages about both Indian weddings and American weddings were given to readers in India and America. The readers of both countries were familiar with the vocabulary used in the readings. The results of the experiment showed that the Americans read about the American weddings with greater comprehension and the readers in India had better comprehension of Indian weddings.

An unexpected result was discovered by Lipson (1984) when she tested 28 third grade average and below average readers. First, the children were assessed on their prior knowledge of eight selected

topics. Next, the children were given the same recognition items that would be used for post-testing. Finally, they were asked to freely recollect anything they knew about the topics. One week later the children were given eight expository passages. After reading each passage, they answered six questions which were the same as the first session. The final activity was the children's retelling of the passage just read. The conclusion which was drawn from the results was that children do depend on their prior knowledge to answer questions rather than on the text. Only when they felt they did not know the answer did they use the text. Inadequate prior knowledge can interfere with comprehension. Both the quantity and the quality of children's prior knowledge are factors in comprehending and learning new information.

In an earlier study, Lipson (1983) investigated the impact of culturally specific prior knowledge on the reading comprehension of young subjects whose religious affiliation was either strongly Catholic or Jewish. The 32 subjects were 10 to 12 years old with average or above-average reading ability who lived in middle to upper middle class families. Each child was given a packet which contained three passages of equal length and readability. The first passage was "culturally neutral", the second was about First Communion, and the third discussed a Bar Mitzvah. The results showed that both groups took less time to read the culturally familiar passages. Another result was that the subjects were more accurate in free recall and recalled more text explicit and inferred material on the familiar culturally specific passage. Also, children were more

successful when responding to probed recall questions on the culturally familiar passage. These findings indicate that the subjects were much more likely to comprehend text when they had a culturally appropriate schema into which to incorporate the new information.

Analysing the results, however, Lipson observed an interesting phenomenon. The children recalled the "culturally neutral" passage more accurately than they did the passage which was not their religious affiliation but with which they had some familiarity.

The last study to be discussed in this section is one conducted by Stevens (1982). The subjects were first tested for their comprehension ability on general topics. They were then randomly divided into two groups. One group received instruction on the background of the passages which they would be reading. The other group received nonrelevant instructions. Both groups read the passages and answered comprehension questions. Stevens concluded from the results that providing background information through instruction does result in improved reading of that topic. This remained true when reading ability was factored out.

These studies, and similar ones, seem to confirm the theory that content and factual knowledge (global knowledge) are important elements of good comprehension. Some of the research indicates that the quality of the prior knowledge affects the accuracy of the comprehension. Finally, instruction on the background of passages improved reading comprehension.

Metacognitive Knowledge

The type of knowledge that takes as its objective the monitoring of one's own comprehension is known as metacognitive knowledge (Winograd, 1980). This type of knowledge has two aspects (Castleberry, 1984; Winograd, 1980). The first is awareness of the task and what it requires. Regulating the ongoing processes of comprehension is the second.

During this monitoring, the task of the reader is to determine when comprehension is taking place and when it is not. A mature reader can evaluate the information and be aware of what he doesn't know and decide what can be inferred from what is known (Castleberry, 1984). In other words, as Castleberry (1984, p.208) writes, "Good readers think about their reading and check themselves when the process breaks down."

Reis and Spekman (1983) conducted two studies on metacognitive knowledge. Fifty-four middle school students were involved in the first study. The results of the study indicated that students could detect and correct reader-based inconsistencies to a significantly greater degree than text-based inconsistencies. The second study involved twenty-four middle grade students who had poor comprehension. They were divided into two groups. The experimental group received instruction in comprehension monitoring. No instruction was given to the control group. The results showed that the experimental group scored higher on reader-based inconsistencies than the control group. However, there was no significant difference in their

performance on text-based inconsistencies.

Research in this area is not conclusive. Most of the research that has been done has been studies of error detection. The results of these studies are not consistent (Winograd, 1980). Another way of checking the metacognitive process was used by Clay (Winograd, 1980) when she had young children do oral reading. Spontaneous self-correction of errors was recorded. The results of this study indicated that the self-correction rate was a more accurate predictor of achievement than readiness scores or intelligence tests (Winograd, 1980). This would seem to indicate that this method of research does identify the readers who are monitoring their reading. Unfortunately, this is only a test of oral reading.

Research in this area needs to be developed. A good method of evaluating this type of knowledge has not been formulated. What seems to be evident is that most readers can monitor their comprehension. The questions researchers need to address are how and under what conditions metacognition is used (Winograd, 1980).

The Effect of Prior Knowledge on Test Questions

Although the effect of prior knowledge on comprehension has been and is being researched, little is being done in the area of its effect on standardized comprehension tests.

Because reading comprehension appears to involve prior knowledge, all standardized tests would appear to be biased. According to Johnston (1984, p.220), "Test bias is any factor other than that being measured which systematically influences an individual's test score." Johnston states three ways in which standardized tests are

constructed to remove the effects of prior knowledge. The first approach is to have a number of relatively brief passages dealing with a broad range of topics. This approach may favor the readers who have a stronger general knowledge. The second approach is to eliminate all items which could be answered without reading the text by students who have a vast store of knowledge. Finally, tests may be constructed so that bias based on cultural differences is eliminated. Johnston (1984, p.221) concludes by writing, "All of these approaches can be criticized because the basic assumption that it is possible to construct reading comprehension tests which will produce scores that are immune to the influence of prior knowledge is erroneous.... If indeed unaffected by prior knowledge, whatever it measured, it would not be measuring reading comprehension."

Obviously, the answer to test bias is not the complete removal of bias. When students do well on a standardized test, one can assume that the students have the prior knowledge necessary to succeed in the academic situation for which they were assessed. On the other hand, low scores do not supply enough information. The scores could be the result of insufficient content or factual knowledge or the lack of strategic knowledge. Therefore, there should be a way to measure the students' prior knowledge. This information could then be used in decisions about remediation. Instruction for lack of general prior knowledge would be different from that given for inadequate reading processing skills (strategic knowledge).

In order to control for prior knowledge the test must have a way of determining prior knowledge. Some ways of doing this are:

1. Test the student on familiar and unfamiliar passages.

2. Have the student rate the familiarity of passages or topics.

3. Ask questions before giving the passage which would indicate the extent of prior knowledge.

4. Give a test on vocabulary related to the passages.

By controlling for prior knowledge, it can be determined if the low score is related to a lack of prior content or factual knowledge or to a lack of strategic knowledge.

The study done by Feeley, et al (1985) indicated that on the N-D, a curriculum specific test that is tied to what is taught in a comprehensive high school, exposure to the topics did affect the test scores significantly. These results suggest that on the N-D test the students' prior knowledge influences the test scores. On this test, the students' prior content and factual knowledge of academic topics is possibly being tested, as well as their strategic knowledge.

To control for prior knowledge, a prior knowledge inventory (PKI) was given to both groups in the Feeley, et al, study. Although the students exposed to the background information indicated slightly higher levels of awareness about test topics, the difference was not significant. The researchers concluded from the PKI results that students' awareness of knowledge was not as important as the knowledge itself.

What has been written about prior knowledge and comprehension tests seems to indicate that standardized tests are affected by this factor. There is a dearth of research in this area to substantiate the theories.

Conclusions

Some themes became evident as the above material was researched. The fact that prior knowledge is important to reading is not only a theory but also supported by a great body of research. However, the research on both comprehension and prior knowledge leaves many questions unanswered. Although the general principle that prior knowledge does affect reading can be supported, the details of how, when and why are still unclear and not well documented (Santa, 1981; Pearson, 1981; Johnston, 1983). Santa sums up this first theme when she writes, "Research to this point has done little more than verify teacher intuitions. Yet such verification is important for it provides teachers with the confidence to stress even more the development and activation of background knowledge. What we now need is to progress toward a more specific understanding of how background knowledge functions in particular reading situations" (Santa, 1981, p.163).

The second theme is that more research needs to be done on how access to prior knowledge occurs (Johnston, 1983; Johnson, 1981; Reis and Spekman, 1983; Castleberry, 1984). In some instances readers have the prior knowledge needed but do not apply it to the text. Studies being done by Langer (1984), and others, are exploring how to help students apply prior learning to text comprehension.

Another theme is that if the psycholinguistic theory of reading and the research on prior knowledge are to be put into instructional practice, background knowledge should be emphasized in instruction (Stevens, 1982; Trabasso, 1980; Pearson, 1981; Johnson, 1981). The psycholinguistic approach to reading would stress bringing meaning

to the text by using one's prior learning. As David Pearson (1981, p.130) writes, "It may be that the best way to help children comprehend better is to help them understand their world better."

Finally, the construction of standardized tests should include a way of controlling for prior knowledge either by measuring a student's prior knowledge or by using passages that are on topics so general or global in nature that it can be assumed that most people would know about them. There will always be some bias, but these general kinds of passages should produce less than the N-D. Once it is known whether or not a student performed poorly because of the lack of factual and content information or because of poor processing skills, one can begin to determine what the test is really testing. Analyzing test items to determine what task each requires also helps to evaluate what the test is testing. In constructing a test, the above factors should be taken into consideration.

Methods and Procedures

In order to learn whether or not exposure to the topics on the NJCBSPT would affect performance on this test, an experimental group of college freshmen read and discussed articles on the topics as an adjunct to their class text for a basic skills course while a control group read placebo articles. This chapter will discuss the subjects selected for the study and instruments and procedures used in carrying out the research.

Subjects

Setting

This study was conducted during the Fall semester, 1984, at the William Paterson College, Wayne, N. J. William Paterson College is one of eight college campuses in the State College system which is supported by the citizens of New Jersey. Founded in 1855, the school has grown from a teachers' college to today's multi-purpose institution composed of seven schools offering 34 undergraduate and 14 graduate degrees.

The majority of students attending the college are from the northern New Jersey area. Although there are students who reside in the college dormitories, most of the students commute from their homes in the surrounding area. Generally, the students are from families whose income is in the lower-middle to middle economic bracket. The student population has a large age range, from recent high school graduates to older people who are continuing their education.

Sample

The sample selected for this study consisted of 33 freshmen from two sections of the course RLA 107 Introduction to College Reading. The sections were randomly designated as the experimental group and the control group. Section 12, consisting of 9 males and 8 females for a total of 17 students, was the experimental group. The control group was section 14, which had 16 students, of whom 6 were males and 10 were females. Table 1 shows the distribution of subjects.

The students taking the RLA 107, a non-credit remedial course, were required to attend this course because their scores on the reading comprehension section of the NJCBSPT were below the criterion set by the college. Due to the fact that the students were allowed to register for any section of RLA 107, the sample will be considered a random selection.

The New Jersey College Basic Skill Placement Test

The passages on the NJCBSPT are followed by multiple choice questions. The passages are similar in content and format to the general type of reading most adults are exposed to. In other words, the passages are not based on academic content areas with specialized styles of writing peculiar to that subject. However, the passages do cover a variety of subjects and represent a number of different writing purposes, as well as being written in diverse styles.

In order to answer the questions, students are expected to

TABLE 1

Distribution of Subjects

Population	Experimental Group N = 12	Control Group N = 14	Total
Male	9	6	15
Female	8	10	18
Total	17	16	33

read the passages, carefully noting details and paying attention to tone. The questions which follow are designed to test the students' basic skills in reading. The skills tested are the ability to identify main ideas, to interpret ideas, to draw inferences and to recognize relationships.

The reading comprehension section of the test is comprised of 57 items. Since seven of these items are embedded for trial purposes, they are not included in the students' scores.

To determine the reading levels of the eleven reading passages, they were subjected to five readability formulas through the use of a computer program, School Utilities Vol. 2 (McCarthy and Erickson, 1982). The estimates of the formulas on each passage were then averaged (see Table 2). The range of the averaged reading levels was from ninth grade level through the 15th grade level. The modal reading level for the passages was 12th grade (see Table 3).

Validity of the NJCBSPT

The questions on the basic skills test have remained essentially the same since the fall of 1978, when the first test was given. Each year the results of the test are analyzed by the following New Jersey committees: Reading and Writing Advisory Committee, the professional staff of Educational Testing Service and the Basic Skills Council. The Basic Skills Council is comprised of both high school teachers and college professors. After the items have been carefully reviewed, some items are deleted. These items are replaced by items which have been pre-tested and then subjected to item analysis

TABLE 2

READABILITY

Passages	Dale-Chall	Fry	Raygor Readability Estimate	Flesch Readability Score	The Gunning Fog
1	9th-10th	9th	11th	10th	13.8 10.6
2	College Graduate	14th	Scientific Professional Technical	College Freshman-Junior	12.1 14.8
3	11th-12th	12th	11th	College Freshman-Junior	15.2 12.7
4	11th-12th	12th	11th	College Freshman-Junior	15.2 12.7
5	College Graduate	14th	College Level	College Freshman-Junior	16 14.6
6	11th-12th	9th	8th	11th	12.3 10.4
7	11th-12th	13th	9th	College Freshman-Junior	15.6 12.5
8	College Graduate	12th	College Level	College Freshman-Junior	16 14.6
9	9th-10th	9th	8th	9th	11.6 9.3
10	9th-10th	12th	12th	11th	16.2 12.1
11	9th-10th	13th	College 1 Level	College Freshman-Junior	14.6 12.8

TABLE 3

Readability of Passages

Range and Mode

Grade Level	Number of Passages
9	1
10	2
11	0
*12	5
13	0
14	2
15	1

* Mode

to determine appropriateness. The opinion of the committees mentioned above who worked on the development of the 1984 NJCBSPT was that this test validly assesses the proficiencies of entering college freshmen in the basic skills of reading (New Jersey Basic Skills Council, 1984).

Reliability of the NJCBSPT

Since the Fall of 1978, when the NJCBSPT was first administered, more than 300,000 students have taken the exam. In 1983, the NJCBSPT was given at every New Jersey state college and at eleven independent colleges. A new form is developed each year. However, each form is equated statistically to the form used before. So that scores can be compared from year to year, they are reported as standard scores. (See Table 4 for data on means and standard deviations for the years 1979 - 1983.) The Basic Skills Council claims that studies done at both the local and state level confirm that the NJCBSPT is reliable (New Jersey Basic Skills Council, 1984).

Prior Knowledge Inventory (PKI)

The PKI (see Appendix A) was a teacher-designed survey which contained 16 items. The purpose of this survey was to measure students' awareness of their knowledge (Metacognition) of the topics included in the NJCBSPT. The students were asked to describe the amount of knowledge they thought they had about each of the topics by checking one of the four categories: "great deal", "moderate", "minimum" or "none". The categories were then assigned the numerical

TABLE 4

Reading Comprehension

NJCBSPT Mean Scaled Scores

	1979	1980	1981	1982	1983
Number of Students Tested	47,725	47,951	49,833	51,135	51,321
Mean Scaled Scores	165	164	163	163	163
(Standard Deviation)	(12.1)	(12.2)	(12.7)	(12.7)	(12.9)

weights of 4-3-2-1 respectively. To control for indeterminate responses, four distractors were included. Johnston (1983) suggests such an inventory as a means of controlling for prior knowledge. The validity and reliability of this instrument has not been established.

Procedures

During this study both the experimental and control groups were taught by the same professor. On the first day of both classes, the students received the same syllabus with the same required texts and quizzes (see Appendix B). The professor explained at the beginning of the course that the purposes of RLA 107 would be to develop vocabulary, literal/inferential/critical comprehension, study skills, reading versatility, test-taking strategies and notetaking techniques.

All students then took the Nelson-Denny test, Form E. Any student receiving a comprehension score at or above the 5th stanine was exempted from the course. To be sure that the two sections were equal, their reading comprehension subtest scores on the NJCBSPT, which they had taken for placement in college, were subjected to t-test procedures. There was no significant difference (Control: $\bar{X} = 25.88$, $SD = 7.86$; Experimental: $\bar{X} = 27.89$, $SD = 2.01$; $t(32) = 2.01$).

The course organization was based on the framework of the text, Integrating College Study Skills (Sotiriou, 1984). Each week a chapter of the text was assigned. In addition, the students were given supplemental reading. At the first session of each week an

assignment was given based on the skill being taught, using the supplementary article as the text. During the second session of the week, the instructor discussed the topic of the article and the assignment based on that text.

To control for the Hawthorne effect, the instructor was careful to give no indication that a study was being conducted. To further control for Hawthorne, both groups were given similar supplementary readings from general reading materials such as magazines. The readings for the experimental group were chosen according to the topics of the test items on the NJCBSPT. The only similarity the articles had to the test passages was the topic (see Appendix C). The readings for the control group were chosen for their interest value and their similarity in length and format (see Appendix C) to those given to the experimental group. The articles were then arranged to be used with the skill that could be most appropriately reinforced by the use of that text. This prevented the experimental group from being exposed to the articles in the order the test items appeared on the NJCBSPT.

The instructional pattern of discussing the skill presented in the chapter of the text, Integrating College Study Skills (Sotiriou, 1984), at the first class session, assigning an exercise on that skill using a supplemental reading, and then discussing both the topic and assignment at the second session was followed during the length of the course.

During the last week of class, before taking the post-test of

the NJCBSPT, both groups were given a Prior Knowledge Inventory (see Appendix A) to complete.

Collection of Data

Data for this study were collected through the administration of a pre- and post-test of the NJCBSPT. The pre-test was given to the students prior to their attendance at the college. The scores were recorded on the records received by the instructor of RLA 107. The post-test was given the last week of the class, December 11, 1984. Additional data were collected through the use of a PKI which was filled out before taking the post-test.

Treatment of Data

The data collected were then analysed to see if exposure to the topics would affect the post-test scores. The pre- and post-test scores on the comprehension subtest of the NJCBSPT were subjected to analysis of variance, repeated measures, procedures (Sex x Treatment x Trials). The significance was set at the .05 level. The total quantitative scores on the PKI were subjected to a two-way analysis of variance (Sex x Treatment).

Summary

In this chapter the subjects, two sections of freshmen at William Paterson College attending the RLA 107 course, were described. Next, the instruments, NJCBSPT and the PKI were discussed. This was followed by an outline of the procedures used. The concluding sections of the procedures described the collection and treatment of data. The following chapter will report the results and discuss them.

The Results

This research project was conducted to determine whether or not exposure to the topics of the reading comprehension paragraphs of the NJCBSPT would affect freshmen college students' comprehension scores on that test. These were general information topics encountered in everyday life. Two sections of Introduction to College Reading were randomly chosen for this experiment. The experimental group (N=17) received articles based on the test's topics to read while the control group (N=16) were given placebo articles to read. In this chapter the results of this study will be reported and discussed.

The Results of the NJCBSPT

The pre- and post-test scores on the comprehension subtest of the NJCBSPT were subjected to analysis of variance (ANOVA), repeated measures, procedures (Sex x Treatment x Trials).

According to the ANOVA Source Table 5, only the main effects of sex and trials were significant. Table 6 shows that the males (M=29.46) did better than did the females (M=24.56) on the test despite condition or trial. For this sample, the males outperformed the females on the NJCBSPT.

Table 7 shows all the cell means. While the experimental group went from a mean of 23.80 to a mean of 30.37 and the control group went from a mean of 25.51 to a mean of 28.40, the differences attributable to the main effect of treatment were not significant. As predicted, direct input of this general information did not significantly affect the post-test results. The experimental

TABLE 5

Analysis of Variance: Sex x Treatment x Trials
for
The New Jersey College Basic Skills Placement Test (NJCBSPT)

Source of Variation	Sum of Squares	Df	Mean Square	F Ratio	Significance
Sex	385.729	1	385.729	4.310	0.047
Treatment	0.277	1	0.277	0.003	0.500 over
Sex x Treatment	0.001	1	0.001	very small	
Unit	2595.664	29	89.506	not tested	
Trials	355.446	1	355.446	19.095	0.001 under
Treatment x Trials	54.050	1	54.050	2.904	0.100
Sex x Trials	0.628	1	0.628	0.034	0.500 over
Sex x Trials x Treatment	4.270	1	4.270	0.229	0.500 over
Trials x Unit	539.810	29	18.614	not tested	

TABLE 6

Means, Standard Deviations and Cell Frequency:

Main Effect of Sex on

The New Jersey College Basic Skills Placement Test (NJCBSPT)

		Experimental	Control	Total
Females	Mean	24.62	24.50	24.56*
	S.D.	9.07	5.64	
	Number	8	10	18
Males	Mean	29.55	29.41	29.46*
	S.D.	5.79	5.77	
	Number	9	6	15

* $p < .047$

TABLE 7

Means for All Cells:

Main Effect of Trials on

The New Jersey College Basic Skills Placement Test (NJCBSPT)

	Trial 1			Trial 2		
	Female	Male	Total	Female	Male	Total
Experimental (N = 17)	21.50	26.11	23.80	27.75	33.00	30.37
Control (N - 16)	22.70	28.33	25.51	26.30	30.50	28.40
Total (N = 33)	22.10	27.33	24.06*	27.02	31.75	29.38*

* $p < .001$

group, which read pieces about the topics found in the NJCBSPT, did not do significantly better than did the control group which read only placebo pieces.

While the treatment variable did not affect the results, the reading program both groups received did show significant positive results. The total group went from a mean of 24.06 at the pre-test to a post-test mean of 29.38.

Discussion of NJCBSPT

Johnston (1983) classified prior knowledge into three categories: strategic knowledge, content or factual knowledge and metacognitive knowledge. The results of this study indicate that the NJCBSPT tests the student's ability to apply prior knowledge of skills rather than the student's content or factual knowledge.

In this study only the main effects of sex and trials were significant. The fact that the males performed better on this test may be attributed to one of two causes. The first could be simply that in this random sample the males as a group had more ability than the females. The second cause could be that the test topics were biased, giving the males an advantage over the females. The overall results of the test, however, indicate that the first cause is more likely.

The second significant factor was the difference between trials. Both the experimental and the control groups did better after receiving instruction on study skills and exposure to large amounts of reading (articles, short stories and novels) in their reading course. This finding supports the results of other studies such as

Fitzgerald and Spiegel's (1983) study on story grammar and Brown, Smiley, Day, Townsend and Lawton's study (Stein and Baker, 1981) on the teaching of inferencing which indicated that the direct teaching of particular skills improved comprehension.

Exposing the experimental group to the reading topics on the NJCBSPT did not affect their post scores. These results suggest that the topics are ones to which most college freshmen in New Jersey have been exposed (see Appendix for list of topics). In a study involving the Nelson Denny Reading Test (Feeley, Wepner and Willging, 1985), the main effect of exposure to the topics was significant. However, the topics selected for use in the Nelson Denny are curriculum specific and related to academic areas encountered in a comprehensive high school program. Students who had not taken a traditional high school program would probably not have been exposed to this content.

Research (Stevens, 1982; Hirsch, 1984; Lipson, 1983) supports the theory that a person's content and factual knowledge (global knowledge) can affect reading comprehension. In Hirsch's (1984) study, the students at the community college had difficulty comprehending the passages about specific subjects with which they were not familiar. However, they read as well as highly educated readers on a more general passage about friendship. Another study which indicates the difference between specific and general knowledge was conducted by Lipson (1983). In this study Lipson discovered that subjects were much more likely to comprehend text when they had a culturally appropriate schema into which to incorporate the

new information. Information which was not part of their cultural background was more difficult to comprehend. Stevens' (1982) study of ninth graders indicated that comprehension was significantly higher on passages about which the students indicated they knew a great deal than on passages about which the students felt they had little knowledge.

These results, therefore, support the hypothesis that the topics used on the NJCBSPT are so general in nature that exposure to the topics will not affect test scores. This suggests that the NJCBSPT does not test prior content or factual knowledge to any significant degree, but rather tests the knowledge of how to apply skills (processing ability) to gain comprehension of text.

The Results of the Prior Knowledge Inventory

To see if the students were aware of their knowledge about the topics on the NJCBSPT, they were asked to respond to an inventory about the comprehension paragraphs topics. A high score would indicate they thought they knew a great deal.

The total quantitative scores on the Prior Knowledge Inventory (PKI) were subjected to a two-way analysis of variance (Sex x Treatment). According to the ANOVA source Table 8, only the main effect of the treatment was effective ($p<.01$). Students in the experimental group (M=31.79) thought they knew significantly more about the topics than did those in the control group (M=26.10). The two-way (Sex x Treatment) statistics may be seen in Table 9.

TABLE 8

Analysis of Variance:

Sex x Treatment for

Prior Knowledge Inventory (PKI)

Source of Variation	Sum of Squares	Df	Mean Square	F Ratio	Significance
Sex	7.055	1	7.055	0.204	Over 0.500
Treatment	257.729	1	257.729	7.436	0.011
Sex x Treatment	36.491	1	36.659	1.053	0.314
Unit	1005.102	29	34.659	not tested	

TABLE 9

Means for the Prior Knowledge Inventory (PKI):

Sex x Treatment

		Experimental	Control	Total
Females	Mean	30.250	26.700	28.475
	S.D.	6.274	6.430	
	Number	8	10	
Males	Mean	33.333	25.500	29.417
	S.D.	5.385	5.010	
	Number	9	6	
Total	Mean	31.792*	26.100*	28.946

* $p < .01$

Discussion of the PKI

The Previous Knowledge Inventory is a tool used to measure the third type of prior knowledge (Johnston, 1983), metacognition. The students in the experimental group, having recently read articles on the topics, were significantly more aware of their knowledge. However, this type of metacognition had no apparent effect on their test scores.

A similar inventory was used in the research done on the Nelson Denny Test (Feeley, et al, 1985). The students who were exposed to the topics indicated slightly higher levels of awareness but the difference was not significant. However, those students did significantly better on the test than the students who were not exposed to the topics.

Both of these studies support the theory that students' awareness of their knowledge is not as important as the students' actual knowledge of the subject. What role metacognition (in this case, knowledge of what one knows) plays in reading comprehension is not clear. As Winograd (Winograd and Johnston, 1980) pointed out, research in this area is not conclusive. This study has provided results which are somewhat contrary to what might be expected in regard to awareness of the topic and the use of that awareness in comprehending the passages.

CHAPTER V

Summary, Conclusions, Recommendations

Summary

This study was an extension of another study done by Feeley, Wepner, Willging (1985). In researching the effect of prior knowledge on the Nelson Denny Reading Test (N-D), they found that prior knowledge of the academically based topics on this test increased the students' ability to comprehend the passages. This effect of prior knowledge was also evident in other studies (Hirsch, 1984; Marr and Gormley, 1982; Lipson, 1984; Stevens, 1982).

In discussing the results of the N-D study, Feeley, Wepner, Willging (1985) raised the question: Would prior knowledge affect the test scores of a reading comprehension test that used passages which were based on topics of general public knowledge rather than academically based subjects? One such general test is the NJCBSPT. Johnston (1983) points out that one way a test can be constructed to avoid testing prior knowledge is to exclude information which is not common knowledge of the population being tested. Such a test is more likely to test reading processing skills than prior knowledge.

To discover whether or not a test which was not based on academically specific passages would be significantly affected by exposure to the topics, this study was carefully planned and executed. Using two randomly selected sections of college freshmen taking Introduction to College Reading at William Paterson College,

this study began in the fall term of 1984. Each of the students had already taken the pre-test before entering the class. The experimental group was exposed to the topics on the NJCBSPT through reading and discussing supplemental readings related to the topics. The control group was given placebo articles which they also discussed. Before taking the post-test at the end of the term, each class was given a PKI.

The results of the NJCBSPT were subjected to analysis of variance, repeated measures, procedure (Sex x Treatment x Trials). This analysis showed that only the main effects of sex and the trials were significant. Males did better in general, and the total group did better on the post-test after taking the reading course. The group receiving the exposure to topics did no better than did the control group.

The total quantitative scores on the PKI were subjected to a two-way analysis of variance (Sex x Treatment). Only the Treatment was effective. The experimental group which read the articles on the test topics thought they knew more than did the control group.

Major Conclusions

It may be concluded that:

1. Exposure to the topics of a standardired comprehension test based on common experiences did not significantly increase the experimental group's scores.

2. Instruction on basic comprehension skills did significantly increase the scores of both groups.

3. Awareness of topic knowledge did not make a significant difference in the students' comprehension scores. The actual knowledge of the subject appeared to be more important.

Recommendations

Teachers and administrators must be aware of what a test is testing. In tests such as the N-D, it appears that prior knowledge of both strategies and academic content is being tested. On the other hand, tests based on more general information appear to be testing mainly for strategic knowledge or, in other words, the students' ability to use processing skills. Knowing what a test is testing is important for several reasons.

The teacher must understand what the test is testing in order to interpret the results of the test. A teacher most often uses a test to help determine the type of instruction the students need. Instruction will be different for the student who lacks factual and content knowledge than it will be for the student who has not learned the necessary processing skills. For the teacher, understanding of the test is essential for the results of the test to be used effectively.

Knowing what the test is testing is also important for the administrator. In selecting tests, decisions about how the test results will be used will determine what tests will be selected. Often student placement on all levels of education, from kindergarten screening through college testing, is determined in part or completely by test results. When used to determine where students should be

placed, the results of tests should indicate whether the students need more instruction in content and factual knowledge or if they need instruction in processing skills in order to comprehend reading materials.

More research on individual tests needs to be done in order to determine the effects that prior knowledge can have on the scores obtained from these reading comprehension tests.

In addition to research on individual tests, there is a need to study and develop different means of measuring global knowledge. The PKI has been used as one way of measuring awareness of global knowledge. However, as in the case of this study, it was not a good indicator of actual knowledge. Johnston (1983) gives several suggestions of ways to determine global knowledge. Suggestions such as these should be researched and the valid ones should be put into use.

The NJCBSPT appears to be a test which tests basic processing skills. Students who do poorly on the test will most likely benefit from instruction on comprehension skills. It appears that this test is being used appropriately when used as a placement test for students.

A test can only be useful if the results of the test can be interpreted in such a way that placement and instruction are beneficial to the students. That is why this study and similar studies are important to the field of education.

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APPENDIX A

Name _____

Date _____

Section _____

RLA 107 Introduction to College Reading

Check the category which describes the amount of knowledge you have about the following topics:

	Great Deal	Moderate	Minimum	None
1. History of Women's Rights				
2. Paterson Silk Mill Strike				
3. The Causes of Gastronology				
4. Bird and Tree Classifications				
5. Child Labor				
6. Treatment of Mental Illness				
7. The Effects of Films				
8. Different Uses of Metals				
9. Ostriches				
10. Garbology				
11. Female Conditioning				
12. The Characteristics of Bazelles				
13. Female Leadership in the 80's				
14. Shakespeare's Madness at Midnight				
15. Saturn's Satellite, Titan				
16. Use of Astrological Language in the Past				

APPENDIX B

WILLIAM PATERSON COLLEGE OF NEW JERSEY

RLA 107 INTRODUCTION TO COLLEGE READING

Fall 1984

Syllabus

Instructor: Dr. Shelley B. Wepner

Office Hours: T 11:15-12:15
W 3:00- 4:00
R 11:15-12:15

Telephone: 595-2134

Secretary: 595-2310

Required Texts:

1. Integrating College Study Skills: Reasoning in Reading, Listening and Writing, authored by Peter Elias Sotiriou, published by Wadsworth, Inc., 1984.

2. Two Paperback Books
   The God Project, authored by John Saul, published by Bantam Books, 1982.

   The First Deadly Sin, authored by Lawrence Sanders, published by Berkley Books, 1973.

Course Requirements:

1. Reading/Writing Assignments
2. Attendance - 6 absences allowed (4 unexcused, 2 excused)
3. Quizzes - vocabulary and novels
4. Post-testing

Date	Topic/Activity	Assignment
		(Chapters 1-15 and Part 5 refer to Sotiriou Book)
Week of Sept. 4, 1984	Pretesting/ Orientation	Ch. 1 (Thurs)
Week of Sept. 11, 1984	Scheduling/Main Idea	Ch. 2 & Ch. 3 Vocabulary Words

Date	Topic/Activity	Assignment
Week of Sept. 18, 1984	Locating Details	Ch. 4/Vocabulary Quiz
Week of Sept. 25, 1984	Identifying Organizational Patterns	Ch. 5
Week of Oct. 2, 1984	Inferences	Ch. 6/Novel 1
Week of Oct. 9, 1984	Reading Graphs & Tables	Ch. 7/Novel 1
Week of Oct. 16, 1984	Summarizing and Paraphrasing	Ch. 8/Vocabulary Words
Week of Oct. 23, 1984	Characteristics of Lectures	Ch. 9
Week of Oct. 30, 1984	Traditional Note-taking Techniques	Ch. 10/Vocabulary Quiz
Week of Nov. 6, 1984	Alternate Note-taking Techniques	Ch. 11/Novel 2
Week of Nov. 13, 1984	SQ3R	Ch. 12/Novel 2
Week of Nov. 20, 1984	Mnemonics	Ch. 13/Novel 2
Week of Nov. 27, 1984	Examination Strategies: Objective Tests	Ch. 14/Vocabulary Words/Novel 2
Week of Dec. 4, 1984	Examination Strategies: Subjective Tests	Ch. 15/Vocabulary Quiz
Week of Dec. 11, 1984	Skill Application Post-testing	Part 5 (pp. 285-321) Exact pages to be assigned
Week of Dec. 18, 1984	Conferences	

APPENDIX C

Supplementary Articles

Introduction to College Reading RLA 107

Fall 1984

Chapter of Text	Experimental	Control
Chapter 3 Locating the Main Idea pp. 33-54	Lynch, J. (1967). A brief history of astrology in the west. The coffee table book of astrology (pp. 32-35). New York: Viking Press, Inc. Lynch, J. (1967). Shakespeare's artistic use of astrology. The coffee table book of astrology (pp. 257-258). New York: Viking Press, Inc. Heavens. (1982, October 11) New Yorker. pp. 39-40	Bagley, S., Carry, J. & Bruno, M. (1983, August 29). Making machines fit people. Newsweek, p. 68. Rustin, B. (1983, August 29). Civil rights: 20 years later. Newsweek, p. 29.
Chapter 4 Locating Major and Minor Detail pp. 55-76	Stoppard, M. (1982). On being female. Being a well woman (pp. 8-9). New York: Holt, Rinehart and Winston. As more men learn "To think like a woman, the workplace will become a more humane place". (1983, March). Glamour, p. 92.	Zolotow, M. (1984, May). Unforgettable Donald Duck. Reader's Digest, pp. 112-116.
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